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REMARKS

Claims 1-10, 12-21, 25, 27 and 29-44 are currently pending in the application. Claims 29-44 are newly-added claims.

The Examiner, in Paragraph 1 of the office action, has commented regarding the term "0-5 nm thick" in Claims 2, 5 and 6, which has been interpreted to exclude the value 0. This phrase has been modified in Claims 2, 5 and 6 to exclude the 0 term.

The Examiner, in Paragraph 3 of the office action, states that Claim 8 has been given a broad interpretation in light of the terms of the claims. The Applicant submits that Claim 8 must be interpreted in the context of Claim 7, from which it depends, which states that the soft magnetic material in the soft magnetic underlayer is composed of 90% iron cobalt alloy and 10% boron (i.e., $(\text{FeCo})_{90}\text{B}_{10}$). Claim 8 then specifies that the $(\text{FeCo})_{90}$ portion of the soft magnetic material is further comprised of 65% iron and 35% cobalt (i.e., $\text{Fe}_{65}\text{Co}_{35}$). This must be interpreted to mean that 90% of the soft magnetic material is composed of a iron cobalt alloy having 65% weight iron and 35% weight cobalt with the remaining 10% of the soft magnetic material being composed of boron (i.e., $(\text{Fe}_{65}\text{Co}_{35})_{90}\text{B}_{10}$).

In the specification, the Examiner has objected to the disclosure in that paragraph 27 refers to an unnamed co-pending application. The Applicant has modified paragraph 27 to include a reference to the co-pending application.

The Examiner has objected to the Claim 4 because of an informality regarding a typographical error which has been corrected. The Examiner has further objected to Claim 5 because of a typographical informality. In response the Applicant has changed the objected to word "that" to "three" in Claim 5. The Examiner has also objected to the use of the term "SUL" in Claims 5 and 6. In response, the Applicant has substituted the suggested term "soft magnetic underlayer" for the offending term.

The Examiner has rejected Claims 11, 15-20, 22-25, 27 and 28 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. Specifically, the Examiner states that Claim 11 recites the limitation "on the second non-magnetic spacer material" in line 2 for which there is insufficient antecedent basis. Claims 11, 22-24 and 28 have been cancelled from the application. Claims 15-20, 25 and 27, which were previously dependant upon Claim 11 have been modified to depend upon Claim 14. Therefore, the Applicant submits that the Examiner's rejection of these claims under § 112 has been addressed.

The Examiner has rejected Claims 1, 2, 9, 10, 14 and 26 under 35 U.S.C. § 102(e) as being anticipated by U.S. Published Patent Application No. 2002/0028357 A1 (Shukh, et al.). The Examiner states that Shukh discloses a perpendicular magnetic recording medium comprising a substrate, a non-magnetic spacer material on the substrate and a soft magnetic underlayer on the non-magnetic spacer material. First, the Applicant disagrees with the Examiner in that Shukh does not, in any embodiment, show a non-magnetic spacer layer on the substrate, upon which the soft magnetic underlayer is disposed. All embodiments of the invention in Shukh show a magnetic layer directly on the substrate, without the non-magnetic spacer layer therebetween.

Second, the Applicant directs the Examiner's attention to the Amendment to independent Claims 1 and 14, which has added the limitation that the soft magnetic underlayer act as a single magnetic domain and, further, that the soft magnetic underlayer exhibit magnetic anisotropy in a plane parallel to the surface of the recording media. With reference to Figure 3 of Shukh, it can be seen that the alternating layers of magnetic material in the structure of Shukh have anti-parallel magnetic orientations and, as such, the soft magnetic underlayer would not act as a single magnetic domain but would exhibit the properties of a multi-domain magnetic material. Further, the anti-parallel orientation of the magnetism of the alternating layers are not consistent

with a layer of material having a magnetic anisotropy, which would indicate that the magnetic orientations of all layers of the material are orientated substantially in the same direction.

Therefore, the Applicant respectfully submits that, as the result of the amendment to Claims 1 and 14, that these claims and all claims that depend therefrom, are distinguished from Shukh.

Additionally, new claims 29 and 30 have been added to specify that the coupling between layers in the present invention is ferromagnetic, as opposed to Shukh, wherein the layers are anti-ferromagnetically coupled.

The Examiner has also rejected Claims 1-14, 21 and 26 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,687,712 (Sugita, et al.). The Examiner states that Sugita discloses a perpendicular magnetic recording medium which comprises a substrate, a nonmagnetic spacer material on the substrate and a soft magnetic underlayer on the non-magnetic spacer material. The Examiner further states that Sugita fails to disclose a soft magnetic material other than permalloy, but that a CoFeB alloy is a known equivalent in the field of soft magnetic materials to the disclosed permalloy. In response, the Applicant again refers to the amendments to independent Claims 1 and 14, which provide that the soft magnetic underlayer act as a single magnetic domain exhibiting magnetic anisotropy in a plane parallel to the surface of the recording medium. The Applicant respectfully submits that the soft magnetic underlayer disclosed in Sugita would be magnetically isotropic, not exhibiting magnetic anisotropy. No mention is made in the Sugita reference of having a soft magnetic underlayer which exhibits magnetic anisotropy to mitigate the problems of noise discussed in the background of the invention of the present application, nor is there any mechanism disclosed in Sugita for inducing the magnetic anisotropy in the plane of the film. The Applicant submits that the soft magnetic underlayer of Sugita, which lacks the magnetic anisotropy of the current invention, would suffer from the same noise problems as are solved by the magnetic recording medium disclosed in the present invention. As such, the Applicant respectfully submits that

these claims have been distinguished from Sugita as a result of the amendment adding the limitations to Claims 1 and 14.


The Applicant has added Claims 32-39 drawn to a circular magnetic recording medium suitable for use in a magnetic disk drive. These claims have the further limitation that the soft magnetic underlayer has a magnetic easy axis which lies in a radial direction of the circular magnetic recording medium. The Applicant respectfully submits that this limitation is not disclosed in either of the cited references further submits that, as a result, Claims 32-39 are distinguishable over the prior art.

CONCLUSION

The Applicant has modified independent Claims 1 and 14 to add limitations regarding the magnetic anisotropy of the soft magnetic underlayer, which is a point of novelty of the present invention. The Applicant has further addressed the Examiner's comments regarding informalities which have been corrected in the application and rejections under § 112 as a result of the amendments herein and the remarks above. All amendments to the specification have been made to address informalities or typographic errors, and no new matter has been added thereby, nor do these amendments address the substantive rejections of the claims under §§ 102 and 103.

The Applicant respectfully submits that all currently pending claims of the application are now in condition for allowance and requests a Notice of Allowance for these claims at the earliest possible time.

Respectfully Submitted,



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